

component being located in the matrix material and effective, when released into a fuel, to provide at least one benefit to the fuel, the matrix material is (1) substantially insoluble in the fuel in contact with the additive composition and (2) effective to reduce the rate of release of the additive component into the fuel relative to an identical additive composition without the matrix material.

55. (new claim) The additive assembly of claim 54 wherein the matrix material is substantially hydrocarbon insoluble.

REMARKS

The above-identified application has been carefully reviewed in light of the Examiner's communication mailed November 21, 2002. Submitted herewith is a Request for Extension of Time, and required fee, extending the period for responding to the Examiner's communication to and including April 21, 2003.

The specification has been amended, as required by the Examiner, to include the serial numbers of the applications identified on page 5.

Fig. 3 has been amended to properly identify baffle plate 150. A copy of Fig. 3 with the proposed amendment circled in red is submitted herewith.

Claims 1, 2, 8, 9, 12, 13, 16, 37 and 40 have been amended to more clearly define the present invention. Claims 6 and 7 have been canceled, without prejudice, in view of the amendment to claim 1. New claims 42 to 55 have been added and are directed to embodiments for which patent protection is sought. Each of these amendments and the new claims is fully supported by the present specification.

Claims 1, 5, 6, 12 and 14 to 16 have been rejected under 35 U.S.C. 102(b) as being anticipated by Davis. Applicant traverses this rejection as it pertains to the present claims.

In general, the present claims are directed to methods of

releasing a fuel additive into a fuel.

As set forth in independent claim 1, the present methods comprise providing a fuel filter containing a fuel additive combined with a matrix material in a fuel additive composition. The fuel additive is distributed in the matrix material and is effective when released into a fuel to provide at least one benefit to the fuel. The matrix material is at least partially insoluble in the fuel, for example, a hydrocarbon-containing liquid fuel. The fuel filter is positioned between a source of fuel and an internal combustion engine. The method further includes contacting a portion of the fuel additive composition with a portion of the fuel to provide a fuel composition comprising the fuel additive dissolved in the portion of the fuel. The fuel composition is allowed to admix with the fuel. The matrix material remains at least partially insoluble in the fuel during, and preferably after, the above-noted contacting step.

In independent claim 12, the methods comprise providing a fuel additive composition comprising a matrix material and an additive component. The additive component is located in the matrix material and is effective, when released into a fuel, to provide at least one benefit to the fuel. The matrix material is (1) substantially insoluble in the fuel and (2) effective to reduce the rate of release of the additive component into the fuel relative to an identical composition without the matrix material. The methods of claim 12 further provide for contacting the fuel additive composition and fuel as conditions effective to release additive components from the fuel additive composition into the fuel. In these methods, the matrix material remains substantially insoluble in the fuel during, and preferably after, this contacting step.

The matrix material advantageously is effective to provide for sustained release of the additive component into the fuel, for example relative to an additive component without the matrix material. In addition, using an at least partially insoluble or substantially insoluble matrix material, as recited in the present claims, is advantageous in that there is a reduced or substantially

no need to burn or otherwise remove the matrix material from the fuel. Such a need would exist if the matrix material was soluble and dissolved in the fuel. Using the present insoluble matrix materials reduces or substantially avoids this additional burden, while providing effective sustained release of the fuel additive without substantially interfering with the performance of the fuel or of the engine using the fuel.

Davis discloses a fuel filter assembly including a fuel additive encapsulated with a wax substrate to provide for proper release of the fuel additive into the fuel. Davis discloses that the wax is formulated from a high purity, high melting point paraffin that provides clean burning characteristics without adversely compromising the performance or wear characteristics of the engine. Thus, Davis discloses a soluble wax/additive composition which dissolves when contacted with the fuel and is burned with the fuel. Davis discloses that additional additive is only added when a portion of the fuel filter becomes clogged and the fuel level in the filter rises to contact and dissolve additional amounts of wax/additive composition.

Davis does not disclose, teach or suggest the present invention. For example, Davis does not disclose, teach or even suggest a method of releasing a fuel additive into a fuel which includes providing a fuel additive distributed in a matrix material at least partially insoluble in the fuel, as recited in independent claim 1. Further, Davis does not disclose, teach or even suggest providing a fuel additive composition comprising a matrix material and an additive component located in the matrix material in which the matrix material is substantially insoluble in the fuel and is effective to reduce the rate of release of the additive component into the fuel, as recited in independent claim 12. To the contrary, Davis teaches the use of soluble waxes and, thus, teaches clearly, directly and expressly away from the present invention.

Moreover, in the present context, insoluble matrix materials operate or function substantially differently from soluble matrix materials. With insoluble materials, the fuel additive often

diffuses through or out of the matrix and then convection, diffusion and/or one or more other transport processes disperse the additive throughout the fuel. Diffusion through the matrix is often a rate controlling step. With a soluble matrix material, dissolution of the material is often controlling. Thus, it is clear that insoluble matrix materials are different and distinct from soluble matrix materials.

Put another way, one of ordinary skill in the art is provided with no motivation or incentive from the soluble matrix teachings of Davis to modify such teaching to use an at least partially insoluble matrix material and obtain the present methods.

In view of the above, applicant submits that the present claims, and in particular claims 1, 5, 12 and 14 to 16, are not anticipated by and are unobvious from and patentable over Davis under 35 U.S.C. 102(b) and 103.

Claims 2, 3, 4, 30, 31 and 32 have been rejected under 35 U.S.C. 103 as being unpatentable over Davis in view of Hudgens et al. Claims 7 to 11, 13, 17 to 20, 22 to 29 and 34 to 38 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Davis in view of Hudgens et al in view of Taya et al under 35 U.S.C. 103(a). Claims 21 and 33 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Davis in view of Hudgens et al in further view of Taya et al and further in view of Payer under 35 U.S.C. 103(a). Claims 38, 39, 40 and 41 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Davis in view of Hudgens et al in further view of Taya et al and further in view of Schuettenberg et al U.S. Patent 4,639,255. Applicant traverses each of these rejections as they pertain to the present claims 2, 3, 4, 8 to 11, 13, 17 to 29 and 33 to 41.

The teachings and deficiencies of Davis have been set forth previously and are resubmitted here.

Hudgens et al discloses a coolant filter including an interior chamber filled with coated pellets. Hudgens et al discloses that each coated pellet includes an outer coating which encases a separate supplemental coolant additive composition. Hudgens et al

discloses that the coating materials may be insoluble in the coolant or soluble in the coolant.

Hudgens et al does not specifically disclose, teach or suggest the present invention. For example, Hudgens et al does not specifically disclose, teach or even suggest methods for releasing a fuel additive into a fuel, as recited in the present claims. As the present specification makes clear, at page 10, fuel systems are unlike coolant systems used in internal combustion engines because fuel systems do not recirculate all of the fuel. Therefore, under these conditions a significant amount of fuel entering a filter has not been recycled through the filter and for all practical purposes includes very little dissolved additive. Coolant systems are simply different from fuel systems.

In addition, Hudgens et al does not specifically disclose, teach or even suggest a fuel additive composition including a fuel additive component and an at least partially fuel insoluble or substantially fuel insoluble matrix material, as recited in the present claims.

In short, applicant submits that the coolant related teachings of Hudgens et al provide no motivation or incentive to one of ordinary skill in the art to use such teachings in combination with the deficient teachings of Davis for any purpose, let alone for the purpose of obtaining the present methods of releasing fuel additives into fuels, as recited in the present claims.

In view of the above, applicant submits that the present claims, and in particular, claims 2 to 4 and 30 to 32, are unobvious from and patentable over Davis in view of Hudgens et al under 35 U.S.C. 103(a).

Next, the Examiner relies on Taya et al.

Taya et al discloses an image forming apparatus and a process cartridge including a toner for developing an electrostatic image that is constituted by at least a binder agent and a charge control agent. Taya et al, at column 13, line 63 through column 14, line 36, relied on by the Examiner, discloses the incorporation of one or more release agents within the toner. Taya et al discloses that

the release agent may include waxes, polymeric materials and acids.

Taya et al does not disclose, teach, or suggest the present invention. For example, Taya et al does not disclose, teach or even suggest anything whatsoever regarding any methods of releasing a fuel additive into a fuel, as recited in the present claims. Producing an image producing toner including a release agent has absolutely nothing to do with releasing a fuel additive into a fuel.

Simply put, Taya et al provides no motivation or incentive to one of ordinary skill in the art to combine the image producing toner teachings of Taya et al with the coolant teachings of Hudgens et al and the soluble wax teachings of Davis et al for any purpose, let alone for the purpose of making obvious the present invention.

Applicant submits that there is no proper basis for combining the teachings of these three references directed to substantially different and distinct subject matters to make obvious the present invention.

In view of the above, applicant submits that the present claims and in particular claims 8 to 11, 13, 17 to 20, 22 to 29 and 34 to 38, are unobvious from and patentable over Davis in view of Hudgens et al and further in view of Taya et al under 35 U.S.C. 103(a).

The Examiner further cites Payer with regards to claims 21 and 33.

Payer discloses that the flowability of mineral oils and mineral oil distillates is improved by the addition of mixtures of ethylene-vinyl acetate-diisobutylene terpolymer, an oxidized polyethylene wax and/or an oxidized ethylene-vinyl acetate copolymer.

Payer does not disclose, teach, or suggest the present invention. For example, Payer does not disclose, teach or even suggest any methods of releasing a fuel additive into a fuel employing a fuel additive located in a matrix material, as recited in the present claims. Payer does not teach or even suggest any additives located in any matrix materials. Payer discloses the use

of certain polymeric materials useful to improve flowability of mineral oils and distillates. Applicant believes such flowability additives are soluble in the mineral oil or distillate the flowability of which is to be improved. Thus, Payer is in direct contrast to the present invention involving at least partially insoluble or substantially insoluble matrix materials. Payer does not supply the deficiencies apparent in the teachings of Davis, Hudgens et al, and Taya et al.

In view of the above, applicant submits that the present claims, and in particular claims 21 to 33, are unobvious from and patentable over Davis in view of Hudgens et al and Taya et al and further in view of Payer under 35 U.S.C. 103(a).

The Examiner further relies on Schuettenberg et al with regards to claims 38 to 41.

Schuettenberg et al discloses structural agents which are soluble and dispersible in fuel. Schuettenberg et al also discloses pelleting agents soluble in fuel which can be foamed to entrap gas when solidified.

Schuettenberg et al does not disclose, teach or suggest the present invention. For example, Schuettenberg et al does not disclose, teach or even suggest any method for releasing a fuel additive into a fuel employing a fuel additive located in a matrix material which is at least partially insoluble or substantially insoluble in fuel, as recited in the present claims. The teachings of Schuettenberg et al are substantially deficient in that no matrix material of any type appears to be disclosed. The fact that Schuettenberg et al discloses soluble materials to be placed in contact with fuels actually teaches away from the present invention.

In view of the above, applicant submits that the present claims, and in particular claims 38 to 41, are unobvious from and patentable over Davis in view of Hudgens et al and Taya et al and further in view of Schuettenberg et al under 35 U.S.C. 103(a).

Claims 9, 11, 16, 30 to 32 and 34 to 37 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al.

Claims 8, 13, 17 to 20 and 22 to 29 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al in view of Davis and Taya et al. Claims 21 to 33 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al in view of Davis and Taya et al and further in view of Payer. Claims 38 to 41 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al in view of Davis and Taya et al and further in view of Schuettenberg et al. Applicant traverses each of these rejections as it pertains to the present claims 8 to 11, 13, 16 to 20, and 21 to 41.

Martin et al is based on the parent application of the above-identified application. Martin et al does not specifically disclose, teach or suggest the methods of releasing fuel additives into fuel recited in any of the presently rejected claims. For example, Martin et al does not specifically disclose, teach or suggest a fuel additive composition including a fuel additive distributed in an at least partially fuel insoluble or a substantially fuel insoluble matrix material and further comprising a coating material substantially surrounding at least a portion of the additive component and the matrix material, as recited in claims 9 and 11, 31 and 32 and 34 to 37. To the contrary, Martin et al discloses the use of either a coating or a matrix material but not both for use in a single composition. Note for example, the alternative language set forth at column 5, lines 57 to column 6, line 6. Clearly, Martin et al discloses the use of coating materials or, in other embodiments, matrix materials. In addition, Martin et al does not specifically disclose, teach or suggest the present methods including matrix materials initially present in other than solid form, as recited in claim 16, or fuel additive compositions including layers of different mixtures of additive component and matrix material, as recited in claim 30.

In view of the above, applicant submits that claims 9, 11, 16, 30 to 32 and 34 to 37 are unobvious from and patentable over Martin et al under 35 U.S.C. 103(a).

The teachings and deficiencies of Davis, Taya et al, Payer and

Schuettenberg et al have been discussed previously. Such teachings and deficiencies are resubmitted here.

The combinations of Martin et al in view of Davis and Taya et al or Martin et al in view of Davis and Taya et al, and further in view of Payer or Schuettenberg et al do not make obvious the presently rejected claims. For example, none of Martin et al, Davis and Taya et al even suggest a method of releasing and a fuel additive into a fuel comprising providing a fuel additive combined with a matrix material in a fuel additive composition in which the matrix material is at least partially insoluble in the fuel, as recited in claim 1 in which the matrix material is made of polymeric material, as recited in claim 8. Martin et al does not specifically disclose any such polymeric material. As noted previously, Davis involves soluble matrix materials and Taya et al has absolutely nothing to do with releasing fuel additives into fuels.

In view of the above, applicant submits that claim 8 is unobvious from and patentable over the combination of Martin et al in view of Davis and Taya et al under 35 U.S.C. 103.

Claim 13 is patentable over Martin et al in view of Davis and Taya et al for substantially similar reasons that claims 8 is so patentable.

Claim 17 is patentable over Martin et al in view of Davis and Taya et al since the combination does not disclose, teach or suggest a method of releasing a fuel additive into a fuel, as recited in claim 12 in which the substantially insoluble matrix material has a melting point of at least above 82°C, as recited in claim 17.

Claim 18 is patentable over Martin et al in view of Davis and Taya et al for the reasons set forth with regard to claims 8 and 13, and in addition because claim 18 requires a matrix material comprising more than one polymeric material which feature is not disclosed or even suggested by the combination of references relied on by the Examiner.

Claim 19 is patentable over Martin et al in view of Davis and

Taya et al for the reasons set forth with regard to claims 8 and 13.

Claims 20 and 22 to 29 are patentable over Martin et al in view of Davis and Taya et al for substantially the same reasons set forth with regard to claims 8 and 13 and in addition because each of these claims identify more specific polymeric materials which are not disclosed or even suggested for use in the present invention by any of the references of the present combination.

In view of the above, applicant submits that claims 8, 13, 17 to 20 and 22 to 29 are unobvious from and patentable over Martin et al in view of Davis and Taya et al under 35 U.S.C. 103(a).

Payer does not supply the deficiencies apparent in the combination of Martin et al in view of Davis and Taya et al to make obvious the invention set forth in claims 21 and 33. Specifically, none of the references, singly or in any combination, disclose, teach or even suggest a method of releasing a fuel additive into a fuel comprising providing a fuel additive combined with a substantially insoluble matrix material in which the matrix material is a polymeric material comprising a copolymer of ethylene and vinyl acetate, as recited in claims 21 and 33. The fact that Payer may disclose such polymeric materials for different purposes does not render obvious the present methods of releasing fuel additives into fuel claims.

In view of the above, applicant submits that claims 21 and 33 are unobvious from and patentable over Martin et al in view of Davis and Taya et al and further in view of Payer under 35 U.S.C. 103(a).

Applicant submits that Schuettenberg et al does not supply the deficiencies apparent in the teachings of Martin et al in view of Davis and Taya et al with regard to claims 38 to 43.

In view of the above, applicant submits that claims 38 to 43 are unobvious from and patentable over Martin et al in view of Davis and Taya et al and further in view of Schuettenberg et al under 35 U.S.C. 103(a).

In addition, applicant submits that new claims 42 to 55 are

not anticipated by and are unobvious from and patentable over the prior art under 35 U.S.C. 102 and 103.

In conclusion, applicant has amended the specification and drawings as requested by the Examiner. In addition, applicant has shown that the present claims are not anticipated by and are unobvious from and patentable over the prior art under 35 U.S.C. 102 and 103. Therefore, applicant submits that claims 1 to 5, and 8 to 55 are allowable and respectfully requests the Examiner to pass the above-identified application to issuance at an early date. Should any matters remain unresolved, the Examiner is requested to call (collect) applicant's attorney at the telephone number given below.

Respectfully submitted,



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Attached: VERSION WITH MARKINGS TO SHOW CHANGES

VERSION WITH MARKINGS TO SHOW CHANGES

IN THE SPECIFICATION:

--Commonly assigned U.S. Patent Application Serial Nos. 09/939,196 [(Attorney Docket No. D-2874)] and 09/939,212 [(Attorney Docket No. D-2912)], filed on an even date herewith, are directed to somewhat related subject matter. The disclosure of each of these co-pending U.S. applications is incorporated in its entirety herein by reference.--

IN THE CLAIMS:

1. (Amended) A method of releasing a fuel additive into a fuel, said method comprising the steps of:

providing a fuel filter containing a fuel additive combined with a matrix material in a fuel additive composition, said fuel additive being distributed in said matrix material and being effective when released into a fuel to provide at least one benefit to said fuel, said matrix material being at least partially insoluble in said fuel, said fuel filter positioned between a source of fuel and an internal combustion engine;

contacting a portion of said fuel additive composition with a portion of said fuel to provide a fuel composition comprising said fuel additive dissolved in said portion of said fuel, said matrix material remaining at least partially insoluble in said fuel during said contacting; and

allowing said fuel composition to admix with said fuel.

2. (Amended) The method of claim 1 wherein said fuel additive composition is coated with a hydrocarbon insoluble coating.

8. (Amended) The method of claim [6] 1 wherein the matrix material comprises a polymeric material.

9. (Amended) The method of claim [6] 1 wherein the fuel additive composition further comprises a coating material surrounding at least a portion of the additive component and the matrix [component] material.

12. (Amended) A method of releasing a fuel additive into fuel, said method comprising the steps of:

providing a fuel additive composition comprising:

a matrix material and an additive component, the additive component being located in the matrix material and effective, when released into a fuel, to provide at least one benefit to the fuel, and the matrix material being (1) substantially insoluble in the fuel and (2) effective to reduce the rate of release of the additive component into the fuel relative to an identical composition without the matrix material; and

contacting the fuel additive composition and fuel at conditions effective to release additive component from the fuel additive composition into the fuel, the matrix material remaining substantially insoluble in the fuel during the contacting.

13. (Amended) The method of claim 12 wherein the matrix [materials] material comprises at least one polymeric material.

16. (Amended) The method of claim 12 wherein the matrix material is initially in a form selected from the group consisting of [a solid,] a gel or a paste in the fuel additive composition.

37. (Amended) The method of claim 31 wherein the matrix material is initially a liquid in the fuel additive composition.

40. (Amended) The method of claim [11] 12 wherein the fuel additive composition further comprises a reinforcement component in

an amount effective to increase the structural strength of the fuel additive composition relative to an identical fuel additive composition without the reinforcement component.